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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,566	10/23/2003	Ravi Narasimhan	MP0337	3596

26200 7590 05/31/2007
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EXAMINER	
TRAN, KHAI	
ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
05/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

TH

Office Action Summary	Application No.	Applicant(s)	
	10/693,566	NARASIMHAN, RAVI	
	Examiner	Art Unit	
	KHAI TRAN	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-82* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 3/9/2007 has been entered. Claims 1-82 are pending in this Office action.

Claim Rejections - 35 USC § 102

2. Claims 1-82 remain rejected under 35 U.S.C. 102(e) as being anticipated by Mody et al (U.S. Pat. 7,088,782).

Regarding claim 1, Mody et al disclose a method comprising: transmitting a first training symbol on a plurality of antennas, wherein the first training symbol comprises a plurality of data symbols (col. 5, line 54 to col. 6, line 15), wherein each of the plurality of data symbols corresponds to different ones of a plurality of tones (col. 7, lines 7-27, and col. 10, line 57 to col. 11, line 5), and wherein each of the plurality of antennas transmits a corresponding one of the plurality of data symbols (Figure 1, and see col. 8, lines 49-65, shows that the transmitter comprising a plurality of antennas for transmitting the training symbols to a receiver for performing time synchronization, frequency synchronization, and channel parameter estimation).

Regarding claim 2, Mody et al disclose the method further comprising transmitting step of transmitting a second training symbol (N_I) on the plurality of antennas (antenna 2), wherein the second training symbol comprising the plurality of data symbols in the first training symbol, and wherein each of the plurality of antennas transmitting a different one of the plurality of data symbols than in the first training symbol (see Fig. 4).

Regarding claim 3, Mody et al disclose wherein the first training symbol has a first pattern in which each of the plurality of antennas transmits one of the plurality of data symbols on a first subset of tones, and wherein the second training symbol has a second pattern comprising a shifted pattern of the first pattern such that each of the plurality of antennas transmits a respective data symbol on a different subset of tones (see col. 7, lines 7-27, showing Generally, such a known sequence of symbols is obtained from an alphabet which has its constituents on the unit circle in the complex domain and such that the resultant sequence in the time domain has a suitable Peak to Average Power Ratio (PAPR). An alphabet in communication systems is defined as a finite set of complex values that each of the symbols can assume. For example, an alphabet of a binary phase shift keying (BPSK) system consists of values +1 and -1 only. An alphabet for a quaternary phase shift keying (QPSK) system consists of the values 1+j, -1+j, 1-j, and -1-j. For example, the training sequence may be generated by modulating each of the tones of the OFDM block using a BPSK alphabet, which consists of symbols +1 and -1. The synchronization scheme may be very general such that any known sequence having suitable properties, such as low PAPR, may be used to form the training sequence).

Regarding 4, Mody et al does not disclose wherein the plurality of antennas comprises N antennas, and further comprising transmitting N-1 training symbols after the first training symbol, Mody et al disclose a the plurality of N- antennas as shown in Figure 1. Therefore, transmitting N-1 training symbols after the first training symbol is inherent in the teaching of Mody et al.

Regarding claims 5-6, Mody et al disclose the transmitting each of the training symbols (or the first training symbol) at least two times (see Figure 4).

Regarding claim 7, Mody et al disclose wherein the plurality of data symbols in the first training symbol are transmitted simultaneously on the plurality of antennas (col. 9, lines 36-43).

Regarding claim 8, Mody et al disclose wherein each of the plurality of antennas transmits the corresponding ones of the plurality of data symbols on corresponding ones of the plurality of tones and transmit null symbols on the other tones (col. 10, line 57 to col.11, line 5.

Regarding claim 9, Mody et al disclose wherein the first training symbol comprises an OFMD (orthogonal Frequency Division Multiplexing) training symbol (col. 9, lines 51-60).

Regarding claim 10, Mody et al disclose a receiver 10 for receiving the transmitted signal from the transmitter 8. The limitations of the claim 10 are similar to claim 1. Mody et al further disclose a step of determining a gain at each of the plurality of antennas for each of the plurality of tones (col. 12, lines 52-65).

Regarding claim 11, Mody et al disclose wherein the determining comprises for each of the plurality of antennas, interpolating values for a plurality of the tones from the corresponding plurality of data symbols received from the antenna (col. 6, lines 1-15).

Claim 12 is similar to claim 4. Therefore, claim 12 is rejected under a similar rationale.

Claim 13 is similar to claim 3. Therefore, claim 13 is rejected under a similar rationale.

Regarding claim 14, Mody et al disclose a step of receiving each of the plurality of data symbols from each the plurality of antennas (see Fig. 1).

Regarding claim 15, Mody et al disclose a step of performing an Invert Fourier transform on the plurality of data symbols received from each of the plurality of antennas (col. 7, lines 57-67).

Claim 16 is similar to claim 1. Therefore, claim 16 is rejected under a similar rationale.

Claim 17 is similar to claims 3-4. Therefore, claim 17 is rejected under a similar rationale.

Regarding claim 18, Mody et al disclose the preamble structure comprising a preamble structure for an NxN Multi-In-Multi-Out (MIMO) system (see Fig. 1).

Claim 19 is similar to claim 9. Therefore, claim 19 is rejected under a similar rationale.

Claim 20 is similar to claim 1. Therefore, claim 20 is rejected under a similar rationale.

Claim 21 is similar to claim 2. Therefore, claim 21 is rejected under a similar rationale.

Claim 22 is similar to claim 3. Therefore, claim 22 is rejected under a similar rationale.

Claims 23-28 are similar to claims 4-9. Therefore, claims 23-28 are rejected under a similar rationale.

Claims 29-34 are similar to claims 10-34. Therefore, claims 29-34 are rejected under a similar rationale.

Claims 35-43 are similar to claims 1-9. Therefore, claims 35-43 are rejected under a similar rationale.

Claims 44-49 are similar to claims 10-15. Therefore, claims 44-49 are rejected under a similar rationale.

Claims 50-58 are similar to claims 1-9. Therefore, claims 50-59 are rejected under a similar rationale.

Claims 59-64 are similar to claims 10-15. Therefore, claims 59-64 are rejected under a similar rationale.

Claims 65-73 are similar to claims 1 (10), 2, 3, 4, 13-19. Therefore, claims 65-73 are rejected under a similar rationale.

Claims 74-82 are similar to claims 65-73. Therefore, claims 74-82 are rejected under a similar rationale.

Response to Arguments

3. Applicant's arguments filed 3/9/2007 have been fully considered but they are not persuasive.

Applicant asserted that Mody does not teach or suggest, at least, a first training symbol that comprises a plurality of data symbols, wherein each of the plurality of data

symbols corresponds to different ones of a plurality of tones, and wherein each of a plurality of antennas transmits a corresponding one of the plurality of data symbols.

In response to the Applicant's argument that Mody discloses the data frames comprises one or more training symbols, a plurality of data symbols wherein the training symbols or preamble having a plurality of the data symbols (see Figure 4, col. 1, lines 55-63, col. 2, lines 26-51), wherein each of the plurality data symbols corresponds to different ones of a plurality of tones (col. 7, lines 7-27, and col. 10, line 57 to col. 11, line 5); and wherein each of the plurality of antennas transmits a corresponding one of the plurality of data symbols (Figure 1, and see col. 8, lines 49-65, shows that the transmitter comprising a plurality of antennas for transmitting the training symbols to a receiver for performing time synchronization, frequency synchronization, and channel parameter estimation). Mody teaches (see col. 9, lines 44-50) that during the transmission of the data symbols, after the communication system 6 has been calibrated, the S matrix consists of Q or more data symbols each occupying an OFDM symbol in the time dimension. The pilot/training symbol inserter 32 inserts the pilot symbols within the data symbols. The data symbols are encoded, modulated, and transmitted from the transmitting antennas 18. Therefore, each of the plurality of antennas transmits a corresponding one of the plurality of data symbols.

Applicant asserted that Mody does not teach or suggest a step of determining a gain at each of the plurality of antennas for each of the plurality of tones.

In response to the Applicant's argument that Mody discloses a step of determining a gain at each of the plurality of antennas for each of the plurality of tones (col. 12, lines 52-65).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHAI TRAN whose telephone number is (571) 272-3019. The examiner can normally be reached on 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAY PATEL can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KHAI TRAN
Primary Examiner
Art Unit 2611

KT
May 25, 2007